

BIOMECHANICAL/PHYSIOLOGICAL ASPECTS OF SHAKEN BABY SYNDROME

Definition: Shaken Baby Syndrome (SBS) is an abusive head injury. Shaken Baby Syndrome is the severe, intentional application of violent shaking in one or more episodes resulting in intracranial injuries to a baby's brain.

- 1) Shaken Baby Syndrome is thought to be the result from a combination of factors relative to a baby's size. The shaking episode(s) causes an acceleration-deceleration injury.
- 2) A baby has a large head in comparison to body size with weak neck muscles. These weak muscles allow the head to move around with little support. The infant's head is whipped forward and backward from the chest to the back. It is synonymous with whiplash in adults, but causes more injury to the brain because of the baby's physical make-up. Often the baby is thrown into the crib or against a wall with additional injury.
- 3) Compared to an adult, a baby has increased water content of the brain. The consistency of a baby's brain is similar to warm Jell-O in a bowl. In addition, a baby has more space between the brain and the bony, rough, inside structure of the skull. The brain undergoes injury as it is thrown back and forth inside the skull. The skull moves one way and the brain another. The Jell-O-like brain becomes liquefied.
- 4) Bridging veins rupture as the brain crashes against the skull and blood collects underneath the skull creating a subdural hematoma. The blood places pressure on the brain.
- 5) Axons (nerve fibers) in the baby's brain have not yet developed myelin (covering on nerve sheaths) and these axons get ripped or severed. Brain swelling and diffuse axonal injury are the major problems that result from the brain trauma.
- 6) Retinal hemorrhages (bleeding in the back of the eye) can occur with shaking. 75% to 90% of SBS cases involve retinal hemorrhages.
- 7) The baby is usually held by the chest facing the assailant and is shaken violently back and forth. The force can cause metaphyseal lesions, which are sometimes referred to as "bucket handle" fractures in the growing portion of the bones.
- 8) When the chest is squeezed very hard in the process of shaking, rib fractures result. The child experiences oxygen deprivation from this insult added to the oxygen deprivation resulting from the actual brain trauma. If shaking continuously and periodically happens (and doesn't result in death) the shaking episodes leave life enduring consequences of mental retardation, seizures, blindness, pain or a resulting existence in a vegetative state.

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